
# Carl Moyer Program Advisory: 06-004

## Revised Criteria and Clarifications to School Bus Fleet Modernization Projects 2005 Carl Moyer Program Guidelines

*This page updated November 30, 2006*

On November 17, 2005, the Air Resources Board (ARB) approved revisions to the Carl Moyer Program Guidelines. The ARB staff issued the approved revised 2005 Guidelines on January 6, 2006. Advisories are subsequently issued as necessary to clarify or modify details within the approved Guidelines.

The Carl Moyer Program fleet modernization project criteria, as presently structured, were developed generically for all heavy-duty vehicles and were not specifically designed for school bus projects. ARB staff re-evaluated those criteria to give air districts and school districts more flexibility in funding school bus fleet modernization projects. This advisory presents the revised project criteria that are to be used only when evaluating school bus fleet modernization projects. The revised criteria presented in this advisory for school bus fleet modernization projects are intended to supplement the existing fleet modernization criteria in the 2005 Carl Moyer Guidelines. When evaluating school bus fleet modernization projects, district staff must use the criteria contained in the 2005 Carl Moyer Guidelines, unless specifically superseded by the criteria in this advisory.

**Revised Criteria for School Bus Projects:**

The following requirements in the 2005 Carl Moyer Guidelines are revised for school bus fleet modernization projects:

**Section VII.B.**

- **Project Life** – The current fleet modernization program limits the project life to 5 years for targeted vocations and 3 years for other vocations. Based on school bus data available to ARB staff, the maximum allowable project life for school buses participating in a fleet modernization program is as follows:
    - Pre-1977 model year (MY) school buses: Five years
    - Model year 1977 and newer school buses: Eleven Years

  The model years shown above refer to the model year of the old school bus that is being replaced, not the new replacement school bus.

- **Eligible Model Years for School Bus** – Heavy-duty vehicles model year 1990 and older are eligible to be replaced under the Carl Moyer fleet modernization program. This requirement is waived for school bus fleet modernization projects. Thus, existing school buses of any model year may participate in the fleet modernization program, provided cost-effectiveness and other specified criteria are met.

**Section VII.C.**

- **Engine warranty** – The current fleet modernization program requires the applicant to purchase a minimum of a one-year or 100,000-mile major component engine warranty for the replacement vehicle. This requirement is waived for school bus fleet modernization projects.
- **Electronic monitoring units** – The current fleet modernization program requires the replacement vehicle to be equipped with an electronic monitoring unit (EMU) to report vehicle miles traveled and the number of miles a vehicle has operated within California and district boundaries. However, it also has a provision that allows a district to waive the requirement for installation of an EMU, upon approval of the ARB. For school bus fleet modernization projects, ARB approval is automatically given for districts to waive the EMU requirement.

**Section X.A.**

- **Maximum award** – The current fleet modernization program limits the maximum funding amount to 80 percent of the cost of a replacement vehicle when the replacement vehicle is a brand new vehicle and to the National Automotive Dealership Association (NADA) adjusted loan value when the replacement vehicle is a used vehicle. These requirements are waived for school bus fleet modernization projects. Thus, the full cost of the replacement vehicle could be funded, provided the cost-effectiveness criterion is met.

**New Criterion for School Bus Projects:**

The following is a new requirement applicable only to school buses. This requirement is added to assure that school buses being replaced through the Carl Moyer fleet modernization program are actually being used to transport children to and from school. Since the California Highway Patrol (CHP) conducts annual safety certification inspections on school buses, the old school bus must be CHP-safety certified in order to be eligible to receive funding. This requirement is consistent with the Lower-Emission School Bus Program Guidelines.

**Section VII.B.**

- **California Highway Patrol (CHP) safety certification requirement** – All school buses participating in the Carl Moyer fleet modernization program must have a current CHP safety certification as of December 31, 2005, and at the time funding is awarded to replace the bus (i.e., the school bus cannot have a lapsed CHP safety certification), and must be currently registered with the Department of Motor Vehicles.

**Clarifications of Criteria for School Bus Fleet Modernization Projects**

**What emission factors are to be used for School Buses?**

All Carl Moyer school bus projects must use the emission factors for medium heavy-duty vehicles as shown in Table B-4 of the Carl Moyer Program Advisory 04-003.

**What particulate matter (PM) weighting factor is to be used for School Buses?**
The PM weighting factor to be used for all school bus projects is the 20 times factor allowed in the 2005 Carl Moyer Guidelines.

**Can old school buses be sold out of the country instead of destroyed?**
The fleet modernization program has a provision that allows a district to request an alternative disposition of the old vehicle.

## Sample Calculation

**Example – Replacing a 1980 MY School Bus with a New 2007 MY School Bus**
The replacement school bus will be delivered from the manufacturer, equipped with a PM trap as standard equipment. The air district does not require installation of an EMU with the replacement school bus.

Baseline Technology Information:
- Baseline technology: 1980 MY school bus
- Emission rates (Table B-4, 2005 Carl Moyer Guidelines):
  17.21 grams/mile (g/mi) oxides of nitrogen (NOx)
  0.29 g/mi reactive organic gases (ROG),
  0.792 g/mi PM10
- Activity: 13,000 miles/year (mi/yr)
- Percent operated in California: 100 percent

Reduced Technology Information:
- Reduced technology: 2007 MY school bus
- Emission rates (Table B-4, 2005 Carl Moyer Guidelines):
  2.79 g/mi NOx, 0.05 g/mi ROG, 0.024 g/mi PM10
- Cost (quote provided with application): $115,000

Emission Reduction Calculations:
*Formula C-8, 2005 Carl Moyer Guidelines:*
*Estimated Annual Emissions Based on Mileage Using Emission Factors*
1. Annual NOx baseline technology emissions
   (17.21 g/mi * 13,000 mi)(ton/ 907,200 g) = 0.247 tons/year (tons/yr)NOx
2. Annual NOx reduced technology emissions
   (2.79 g/mi * 13,000 mi)(ton/ 907,200 g) = 0.040 tons/yr NOx
3. Annual ROG baseline technology emissions
   (0.29 g/mi * 13,000 mi) (ton/ 907,200 g) = 0.0042 tons/yr ROG
4. Annual ROG reduced technology emissions
   (0.05 g/mi * 13,000 mi)(ton/ 907,200 g) = 0.0007 tons/yr ROG
5. Annual PM10 baseline technology emissions
   (0.792 g/mi * 13,000 mi)(ton/ 907,200 g) = 0.0113 tons/yr PM10
6. Annual PM10 reduced technology emissions
   (0.024 g/mi * 13,000 mi)(ton/ 907,200 g) = 0.0003 tons/yr PM10

*Formula C-10, 2005 Carl Moyer Guidelines: Annual Surplus Emission Reductions by Pollutant (tons/yr) for Repowers and New Purchases:*

- NOx Emission Benefits = 0.247 tons/yr - 0.040 tons/yr = 0.207 tons/yr NOx
- ROG Emission Benefits = 0.0042 tons/yr - 0.0007 tons/yr = 0.004 tons/yr ROG
- PM10 Emission Benefits = 0.0113 tons/yr - 0.0003 tons/yr = 0.011 tons/yr PM10

*Formula C-2, 2005 Carl Moyer Guidelines: Annual Weighted Surplus Emission Reductions*

0.207 tons/yr + 0.004 tons/yr + 20(0.011 tons/yr) = 0.431 weighted tons/yr

Annualized Cost

Project Life = 11 Years

CRF (Table B-1, 2005 Carl Moyer Guidelines) = 0.114

*Formula C-12, 2005 Carl Moyer Guidelines: Annualized Cost*

$115,000 * 0.114 = $13,110/yr

Cost-Effectiveness

*Formula C-1: Cost-Effectiveness of Weighted Surplus Emission Reductions*

= ($13,110/yr) / (0.431 weighted tons/yr)

**= $30,418 weighted tons/yr**

In this example, the cost-effectiveness is more than the threshold of $14,300 per weighted ton of pollutants reduced. This project qualifies for a maximum grant of $54,063 ($14,300/$30,418 x $115,000), which is approximately 50% of the new school bus cost.